DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-4, 6-11, 13, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US Patent: 7,030,846) in view of Stokes et al. (US Patent 6,628,828), further in view of Moon et al. (U.S. Patent 6,762,742).

As to claim 1, Lee teaches a liquid crystal display comprising:

a signal controller (100) with a bit number (i.e. 8 bit) **(applicant's input image data)** smaller than the output image data (i.e. 9 bit) **(applicant's output image data have a bit number greater than the input image data)**, a color correction unit (112, 114, 116) including color **correction** coefficients for performing color correction on the image data from the gamma converter, **the color correction coefficients determined depending on color represented by the liquid crystal display**, and a dithering and FRC processor (122, 124, 126) reducing a bit number of the image data (9 bit) from the color correction unit by taking upper bits of the image data and controlling position and frequency of the upper bits of the image data (see Fig. 8, Col. 8, Lines 1-44);

a data driver selecting the gray voltages from the voltage generator and outputting gray voltages corresponding to the image data from the signal controller(i.e. data driver is able to output select voltages that are generated at the voltage generator, which include V_{on}, V_{off}, and V_{com}) (see Fig. 7, Col. 7, Lines 33-45);

However, Lee does not explicitly teach including a gamma converter outputting output image data based on input image data have gamma characteristic adapted to a gamma 2.2 curve; such that a predetermined one of the gray voltages gives a luminance of about 80 cd/m^2; an inverter controlling a lamp to emit a luminance higher than 80 cd/m^2.

Stokes teaches including a gamma converter (104) outputting output image data based on input image (**applicant's converting input image data into output image data)** data **that** have gamma characteristic adapted to a gamma 2.2 curve (see Stokes Col. 7, Lines 20-21); such that a predetermined one of the gray voltages gives a luminance of about 80 cd/m^2; (i.e. in the SRGB standard the 80 cd/m^2 and 2.2 CRT Gamma is officially enumerated as the luminance level, see ITU-R BT.709) (see Stokes, Fig. 3, Col. 7, Lines 12-24).

Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to have used the sRGB gamma conversion design of Stoves in the overall signal controller of Lee in order to same computing time and speed up operations. (see Stokes, Col. 1, Lines 45-52).

As to claim 2, Stoke teaches the liquid crystal display of claim 1, wherein the gamma converter comprises an R data modifier, a G data modifier and a B data modifier for performing the gamma conversion for the input image data for respective red, green and blue colors, and each of the data modifiers maps the input image data into output image data having a gamma characteristic adapted to the gamma 2.2 curve (i.e. since the sRGB standard requires the change of gamma to the 2.2 setting, the input data must be change accordingly to fit the gamma 2.2 curve) (see Fig. 3, Col. 6, 1-5).

As to claim 3, Stoke teaches the liquid crystal display of claim 2, wherein the data modifiers include a nonvolatile memory (27) (i.e. the hard disk memory device 27 is nonvolatile memory) (see Fig. 1, Col. 3, Lines 15-16).

As to claim 4, Stokes teaches the liquid crystal display of claim 1, wherein the color correction coefficients are expressed in a 3.times.4 color correction matrix (i.e. since by definition a 5x5 matrix contains numerous 3 x 4 matrix, therefore the color correction coefficients are expressed in a 3 x 4 matrix as well).

As to claim 6, it is analyzed to be broader in scope than claim 1 and is rejected on the same ground.

As to claim 7, see discussion of claim 3 above, claim 7 is analyzed to be broader in scope than claim 3 and is rejected on the same ground.

As to claim 8, Stokes teaches the liquid crystal display of claim 6, wherein the target image data storage includes a nonvolatile memory in the signal controller and a nonvolatile memory element provided external to the signal controller.

As to claim 9, see discussion of claim 1 above, Stokes in view of Moon teaches the liquid crystal display of claim 1, wherein the gamma converter (i.e. the computer realizing the Gamma Correction operation 104) obtains the output image data from the input image data by way of a mathematical operation (i.e. the mathematical operation is applied when the transformation of data carried on a one-dimensional look-up table which requires mathematical operations to access and convert the digital data) (see Fig. 3, Col. 7, Lines 28-51).

As to claim 10, Lee teaches a liquid crystal display comprising:

a signal controller (100) with a bit number (i.e. 8 bit) smaller than the output image data (i.e. 9 bit) (**applicant's a gamma converter converting input image data into output image data that have gamma characteristic adapted to a gamma 2.2 curve and have a bit number greater than the input image data**), a color correction unit (112, 114, 116) including color **correction** coefficients for performing color correction on the image data from the gamma converter, **the color correction coefficients determined depending on color represented by the liquid crystal display**, and a dithering and FRC processor (122, 124, 126) reducing a bit number of the image data (9 bit) from the color correction unit by taking upper bits of the image data and controlling position and frequency of the upper bits of the image data (see Fig. 8, Col. 8, Lines 1-44);

a data driver selecting the gray voltages from the voltage generator and outputting gray voltages corresponding to the image data from the signal controller(i.e.

data driver is able to output select voltages that are generated at the voltage generator, which include V_{on}, V_{off}, and V_{com}) (see Fig. 7, Col. 7, Lines 33-45);

a voltage generator generating a plurality of gray voltages by dividing a predetermined voltage lower than a supply voltage (i.e. data driver is able to output select voltages that are generated at the voltage generator, which include V_{on}, V_{off}, and V_{com}) (see Fig. 7, Col. 7, Lines 33-45);

As to claim 13, it has limitations similar to those of claim 4 and is rejected on the same grounds.

a signal controller (100) with a bit number (i.e. 8 bit) smaller than the output image data (i.e. 9 bit) (**applicant's a gamma converter converting input image data into output image data that have gamma characteristic adapted to a gamma 2.2 curve and have a bit number greater than the input image data**), a color correction unit (112, 114, 116) including color **correction** coefficients for performing color correction on the image data from the gamma converter, **the color correction coefficients determined depending on color represented by the liquid crystal display**, and a dithering and FRC processor (122, 124, 126) reducing a bit number of the image data (9 bit) from the color correction unit by taking upper bits of the image data and controlling position and frequency of the upper bits of the image data (see Fig. 8, Col. 8, Lines 1-44);

a data driver selecting the gray voltages from the voltage generator and outputting gray voltages corresponding to the image data from the signal controller(i.e.

data driver is able to output select voltages that are generated at the voltage generator, which include V_{on}, V_{off}, and V_{com}) (see Fig. 7, Col. 7, Lines 33-45);

Moon teaches an inverter (62) controlling a lamp (64) to emit a luminance (i.e. the inverter control modifies the output of the lamp depend on the V_{duty} input) (see Fig. 11, Col. 13, Lines 10-30).

As to claim 14, it is a method of claim 1 and is rejected on the same grounds.

3. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view Stokes, further in view of Moon as applied to claim 1-11, 13-14 above, and further in view of Brown Elliot et al. (US Patent: 7,221,381).

As to claim 15, Stokes teaches the method of claim 11, wherein the gamma characteristic conversion (i.e. step 104) includes a mathematical operation but does not explicitly teaches realized on an application specific integrated circuit (ASIC). Brown Elliot teaches gamma characteristic conversion realized on an application specific integrated circuit (ASIC) (i.e. performing pre-conditioning Gamma prior to rendering using ASIC) (see Brown Elliot, Fig. 52A, Col. 40, Lines 57-65).

Therefore it would have been obvious for one of ordinary skill in the art at the time the invention was made to have used the ASIC circuitry of Brown-Elliot inside the computer system of Stokes in order to allow precise control of gamma to provide high quality images (see Brown-Elliot, Col. 4, Lines 1-2).

Allowable Subject Matter

4. Claim 5, 12, and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. The following is a statement of reasons for the indication of allowable subject matter: None of the prior art either singularly or in combination teaches the color correction matrix with the given specific row and column numbers indicated by the applicant.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Stokes et al. "A standard Default Color Space for the Internet – sRGB" is cited to disclose the sRGB format. Lee et al. (US Pub: 2006/0208983) is cited to teach an almost identical application having different claim scope.

Response to Arguments

1. Applicant's arguments filed 09/22/2008 have been fully considered but they are not persuasive. Applicant argues that Lee, Stokes, and Moon do not teach claim 1, more specifically Lee and Stokes does not disclose **a bit number greater than the input image data**. Examiner, respectfully, disagrees. Lee recites the change of gamma curve in figures 9 and 15 and recites teachings of converting B gamma curve into a target gamma curve, in this way even though Lee does not use the name gamma converter Lee discloses the ideas of such and the color correction circuit is an implementation of this idea. Stokes is cited in combination with Lee to more clearly

teach the gamma converter and the gamma 2.2 curve which Lee is silent on. In this way, the limitation of a bit number can be any bit number used during the process of conversion and since 9 bits are used in one of the steps, Lee and Stokes teach the claimed limitation. Applicant also argues that Lee does not disclose **a voltage generator dividing a predetermined voltage which is lower than the supply voltage**. Examiner, respectfully, disagrees. The voltage generator of the entire display panel 400 also drives the data driver and because the limitation of claim 1 is not effective is linking the gray voltages to data driver, the voltage generator is Lee which provides voltages that enable a gray scale display can be considered as providing gray voltages since digital transmission requires at least two variable values, the voltage generator is capable of creating the high and low values to transmit the RGB gray voltages to the data driver to create the gray scale display.

Conclusion

2. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KENNETH B. LEE JR whose telephone number is (571)270-3147. The examiner can normally be reached on Mon. - Fri. 7:30AM - 4:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bipin Shalwala can be reached on 571-272-7681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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